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## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ ANP/15		<b>Course name:</b> Algorithmic unsolved problems			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> To introduce the student into most important results about non-existence of an algorithm for solving given problem.					
<b>Brief outline of the course:</b> Axiomatic theories of natural numbers. Definability of recursive functions. Tarski theorem on undefinability of truth in formalized arithmetic. Godel incompleteness theorem. Algorithmic unsolvability of particular mathematical problems. Non-existence of an algorithm for deciding the existence of a solution of Diophantine equations. Reduction of problems and degrees of unsolvability.					
<b>Recommended literature:</b> J. Barwise ed., Handbook of Mathematical Logic, North Holland 1977 S. C. Kleene, Introduction to the Metamathematics, Van Nostrand 1952, ruský preklad Moskva 1957. E. Mendelson, Introduction to Mathematical Logic, Van Nostrand 1963, ruský preklad Nauka Moskva 1976. M. Davis, Hilbert's Tenth Problem is Unsolvable, Amer. Math. Monthly, 1973, 233--269. Ju. V. Matijasevič, Diofantovy Množestva, Usp. Mat. Nauk, <b>27</b> (1972), 185--222 L. Bukovský, Algoritmicke neriešiteľné problémy, učebný text v elektronickej forma na sieti Novel, PF UPJŠ, Košice, 2003					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 23					
A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Stanislav Krajčí, PhD.					
<b>Date of last modification:</b> 03.05.2015					

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KFaDF/AFS/05		<b>Course name:</b> Ancient Philosophy and Present Times			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 31					
A	B	C	D	E	FX
80.65	6.45	6.45	0.0	6.45	0.0
<b>Provides:</b> Doc. PhDr. Peter Nezník, CSc.					
<b>Date of last modification:</b> 12.02.2020					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ ATG/13		<b>Course name:</b> Applied graph theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 1.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Based on results of oral exam.					
<b>Learning outcomes:</b> To provide an overview of graph theory applications in computer science and other natural / social sciences.					
<b>Brief outline of the course:</b> The graph models of real-world problems. The elements of complex network analysis. Planarity testing, visualization and colouring algorithms and heuristics. Polynomial instances of NP-complete graph problems. Basics of probability method in graph theory.					
<b>Recommended literature:</b> U. Brandes, T. Erlebach: Network analysis. Methodological Foundations, Springer, 2005.					
<b>Course language:</b> Slovak or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 16					
A	B	C	D	E	FX
12.5	43.75	12.5	12.5	18.75	0.0
<b>Provides:</b> prof. RNDr. Tomáš Madaras, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ ALA/10		<b>Course name:</b> Applied linear algebra			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 1.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> According to tests and to the exam.					
<b>Learning outcomes:</b> To obtain basic knowledge on linear algebra; to be able to apply the theory in concrete excercises.					
<b>Brief outline of the course:</b> Matrices over Euclidean rings, canonical forms. Polynomial matrices. Similar matrices. Jordan normal form. Functions of matrices, sequences, series. Inversion of singular matrices, pseudoinverse matrices and their application.					
<b>Recommended literature:</b> H.E.Rose: Linear Algebra, A Pure Mathematical Approach, Birkhäuser Verlag, 2002. D.Serre: Matrices, Theory and applications, Springer Verlag, 2002. <a href="http://www.cs.ut.ee/~toomas_l/linalg/">http://www.cs.ut.ee/~toomas_l/linalg/</a>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 57					
A	B	C	D	E	FX
31.58	7.02	24.56	5.26	31.58	0.0
<b>Provides:</b> prof. RNDr. Danica Studenovská, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ APA1/15		<b>Course name:</b> Approximation algorithms			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> To learn basic conceptions of randomized algorithms and to classify the algorithms due to their error probability.					
<b>Brief outline of the course:</b> Basic notions of Probability Theory. Basic randomized computing models and its characterisations. Las Vegas algorithms. One sided error Monte Carlo algorithms. Two sided bounded error Monte Carlo algorithms. Two sided unbounded error Monte Carlo algorithms. Classes of randomized algorithms with polynomial time complexity and relationships between them. Optimisation problem, approximation algorithm, relative error, approximation ratio. Special optimisation problems and approximation solutions. Classification of optimisation problems based upon their approximations. FPTAS. PTAS. TSP problem and its relaxations. Unapproximability.					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 144					
A	B	C	D	E	FX
28.47	15.97	20.14	14.58	20.14	0.69
<b>Provides:</b> RNDr. Ondrej Krídlo, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KFaDF/ KDF/05		<b>Course name:</b> Chapters from History of Philosophy of 19th and 20th Centuries (General Introduction)			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 10					
A	B	C	D	E	FX
50.0	20.0	10.0	0.0	10.0	10.0
<b>Provides:</b> doc. PhDr. Pavol Tholt, PhD., mim. prof.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚINF/ KKV1/15	<b>Course name:</b> Classical and quantum computations
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 6	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Written work Written and oral examination	
<b>Learning outcomes:</b> To provide information on quantum computer and quantum computations. To compare classical and quantum models and methods.	
<b>Brief outline of the course:</b> The basics of classical theory of computation: Turing machines, Boolean circuits, parallel algorithms, probabilistic computation, NP-complete problems, and the idea of complexity of an algorithm. Introduction of general quantum formalism (pure states, density matrices, and superoperators), universal gate sets and approximation theorems. Grover's algorithm, Shor's factoring algorithm, and the Abelian hidden subgroup problem. Parallel quantum computation, a quantum analogue of NP-completeness, and quantum error-correcting codes.	
<b>Recommended literature:</b> 1. BERMAN, G.P., DOOLEN, G.D., MAINIERI, R., TSIFRINOVIC, V.I. Introduction to Quantum Computers. World Scientific, 2003. 2. GRUSKA, J. Quantum Computing. McGraw-Hill, 1999. 3. JOHNSON, G. A Shortcut Through Time: The Path to the Quantum Computer, Knopf 2003. 4. KITAEV, A.Y., SHEN, A.H., VYALYI, M.N. Classical and Quantum Computation. American Mathematical Society, 2002. 5. NIELSEN, M.A., CHUANG, I.L. Quantum Computation and Quantum Information. Cambridge University Press, 2000. 6. HIRVENSAALO, M., Quantum Computing, Springer 2004	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 128					
A	B	C	D	E	FX
22.66	35.94	14.84	13.28	7.03	6.25
<b>Provides:</b> prof. RNDr. Gabriel Semanišin, PhD., RNDr. Zuzana Bednárová, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ KMU1/15		<b>Course name:</b> Coding and multimedial data transition			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 18					
A	B	C	D	E	FX
33.33	5.56	22.22	22.22	16.67	0.0
<b>Provides:</b> doc. RNDr. Stanislav Krajčí, PhD., doc. RNDr. Jozef Jirásek, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ KOA/10	<b>Course name:</b> Combinatorial algorithms
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 6	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Evaluation is based on working out the seminar work and on passing the oral examination.	
<b>Learning outcomes:</b> Mastered an ability to understand the close tie between the theoretical and algorithmic aspects of discrete mathematics and to show how algorithms can be extracted from theorems. Ability in proving algorithm correctness.	
<b>Brief outline of the course:</b> Introduction to graphs. Introduction to algorithms and complexity. Sorting algorithms. Search algorithms. Greedy algorithms. NP-completeness. Trees and rooted trees. Generating all spanning trees of a graph. Minimum spanning tree problem. Distance in graphs. Shortest path problem and its analogues. The most reliable path. The largest capacity path. The path with the largest expected capacity. Location centres and medians. Networks: An introduction to networks, the max-flow min-cut theorem. Related problems. Matchings: Maximum matchings in bipartite graphs. Maximum matchings in general graphs. Transportation and assignment problems. Eulerian graphs and Chinese postman's problem. Hamiltonian graphs. Travelling salesman problem.	
<b>Recommended literature:</b> 1. G. Chartrand, O.R. Vellermann: Applied and Algorithmic Graph Theory, McGraw-Hill, Inc. New York 1993. 2. N. Christofides: Graph Theory - An Algorithmic Approach, Academic Press, New York 1975 (Russian translation from 1978). 3. D. Jungnickel: Graphs, Networks, and Algorithms, Springer-Verlag Berlin 2005. 4. J. Plesník: Grafové algoritmy, Veda Bratislava 1983. 5. M. N. S. Swamy, K. Thulasiraman: Graphs, networks, and algorithms. John Wiley and Sons, New York 1981.	
<b>Course language:</b>	

Slovak					
<b>Notes:</b>					
<b>Course assessment</b>					
Total number of assessed students: 112					
A	B	C	D	E	FX
35.71	21.43	22.32	9.82	9.82	0.89
<b>Provides:</b> Dr.h.c. prof. RNDr. Stanislav Jendroľ, DrSc.					
<b>Date of last modification:</b> 13.02.2019					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ KDZ/10		<b>Course name:</b> Combinatorial designs			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Based on results of oral exam.					
<b>Learning outcomes:</b> To present the basics of theory of combinatorial designs and their applications in sciences.					
<b>Brief outline of the course:</b> 2-designs, balanced designs. Symmetric designs, Hadamard matrices, finite projective planes. Steiner systems.					
<b>Recommended literature:</b> I. Anderson, I. Honkala: A short course in combinatorial designs, <a href="http://www.utu.fi/~honkala/cover.html">http://www.utu.fi/~honkala/cover.html</a> D.R. Stinson: Combinatorial Designs: Constructions and Analysis, Springer 2004 W.D. Wallis: Combinatorial designs, Marcel Dekker 1988					
<b>Course language:</b> Slovak or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 82					
A	B	C	D	E	FX
21.95	25.61	28.05	19.51	4.88	0.0
<b>Provides:</b> prof. RNDr. Tomáš Madaras, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice		
<b>Faculty:</b> Faculty of Science		
<b>Course ID:</b> KPPaPZ/KK/07	<b>Course name:</b> Communication and Cooperation	
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present		
<b>Number of ECTS credits:</b> 2		
<b>Recommended semester/trimester of the course:</b> 3.		
<b>Course level:</b> II.		
<b>Prerequisites:</b>		
<b>Conditions for course completion:</b>		
<b>Learning outcomes:</b>		
<b>Brief outline of the course:</b>		
<b>Recommended literature:</b>		
<b>Course language:</b>		
<b>Notes:</b>		
<b>Course assessment</b> Total number of assessed students: 281		
abs	n	z
98.22	1.78	0.0
<b>Provides:</b> Mgr. Ondrej Kalina, PhD., Mgr. Lucia Hricová, PhD.		
<b>Date of last modification:</b> 04.09.2019		
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.		



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚINF/ VYZ1/15	<b>Course name:</b> Computational complexity
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Oral examination.	
<b>Learning outcomes:</b> To give the students the theoretical background in computational complexity and theory of NP-completeness.	
<b>Brief outline of the course:</b> Deterministic and nondeterministic algorithms with polynomial time, NP-completeness. Deterministic simulation of a nondeterministic Turing machine. Satisfiability of Boolean formulae. Another NP-complete problems: satisfiability of a formula in a conjunctive normal form, 3-satisfiability, 3-colorability of a graph, 3-colorability of a planar graph, knapsack problem, balancing, ... Space bounded computations, classes L, NL, PSPACE. Deterministic simulation - Savitch theorem. Closure under complement. Complete problems for classes NL, P, and PSPACE.	
<b>Recommended literature:</b> J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2007. M. Sipser: Introduction to the Theory of Computation, Thomson, 2nd edition, 2006. L.A.Hemaspaandra, M.Ogihara: Complexity theory companion, EATCS series, texts in computer science, Springer-Verlag, 2002. S. Arora, B. Barak: Computational Complexity: A Modern Approach, Cambridge Univ. Press, 2009. G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996. D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994. C. Calude and J. Hromkovič: Complexity: A Language-Theoretic Point of View, in G. Rozenberg and A. Salomaa, Handbook of Formal Languages II, Springer, 1997.	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 325					
A	B	C	D	E	FX
57.85	15.69	11.08	7.38	7.69	0.31
<b>Provides:</b> prof. RNDr. Viliam Geffert, DrSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ TSS/10		<b>Course name:</b> Control theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Based on two written tests during the semester and on the oral examination.					
<b>Learning outcomes:</b> To learn the basic notions of controllable systems.					
<b>Brief outline of the course:</b> Controllable systems. Pontrjagin maximum principle. Linear systems, bang-bang controls, singular controls.. Discrete systems, dynamic programming, Bellmann's optimality principle. Practical applications of theoretical results.					
<b>Recommended literature:</b> 1. K. Macki, A. Strauss: Introduction to Optimal Control Theory, Springer, 1980. 2. G. Feichtinger, R.F. Hartl: Optimale Kontrolle ökonomischer Prozesse, Berlin, 1986.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 139					
A	B	C	D	E	FX
25.18	27.34	23.02	15.83	8.63	0.0
<b>Provides:</b> prof. RNDr. Katarína Cechlárová, DrSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ DBS/15		<b>Course name:</b> Database systems for Mathematicians			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 2 <b>Per study period:</b> 42 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> Acquired basic concepts and techniques of relational database theory and corresponding software.					
<b>Brief outline of the course:</b> Data models. Languages for defining and manipulating data (DDL, DML). Tables, attributes and integrity constraints. Queries: select, where, group by, aggregate and system functions. Nested queries and several tables: join, union, primary, foreign key. Relational algebra. Database modelling. Functional dependency and normalization.					
<b>Recommended literature:</b> - S. Krajčí: Databázové systémy, UPJŠ, 2005 2. J. - Date C.J., Database Design and Relational Theory, O'Reilly, 2012 - Atkinson, P., Vierra, R., BEGINNING MICROSOFT SQL SERVER 2012 PROGRAMMING, John Wiley - Wrox, 2012 - Itzik Ben-Gan, Microsoft SQL Server, 2012 T-SQL Fundamentals, O'Reilly, 2012 - L. Davidson, J.M. Moss, Pro SQL Server 2012 Relational database Design and Implementation, APRESS, 2012					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 701					
A	B	C	D	E	FX
12.55	9.7	12.98	20.26	34.09	10.41
<b>Provides:</b> doc. RNDr. Csaba Török, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ DPP1a/14	<b>Course name:</b> Diploma Project I
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 1	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b> Slovak	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 111	
abs	n
99.1	0.9
<b>Provides:</b> doc. RNDr. Roman Soták, PhD.	
<b>Date of last modification:</b> 03.05.2015	
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ DPP1b/14	<b>Course name:</b> Diploma Project II
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 1	
<b>Recommended semester/trimester of the course:</b> 3.	
<b>Course level:</b> II.	
<b>Prerequisites:</b> ÚMV/DPP1a/14	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b> Slovak	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 107	
abs	n
99.07	0.93
<b>Provides:</b> prof. RNDr. Katarína Cechlárová, DrSc.	
<b>Date of last modification:</b> 03.05.2015	
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ DPO/14		<b>Course name:</b> Diploma thesis and its defence			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 20					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 46					
A	B	C	D	E	FX
56.52	21.74	13.04	4.35	2.17	2.17
<b>Provides:</b>					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ VEP1/15		<b>Course name:</b> Formal methods in a verification			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 2 <b>Per study period:</b> 28 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 2., 4.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 39					
A	B	C	D	E	FX
35.9	28.21	15.38	12.82	2.56	5.13
<b>Provides:</b> doc. RNDr. Gabriela Andrejková, CSc., Mgr. Alexander Szabari, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ ZNA1/15		<b>Course name:</b> Foundations of knowledge systems			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> The goal is to teach students some advanced applications of logic into computer science, especially in database and knowledge systems.					
<b>Brief outline of the course:</b> Logic formulas, semantic, models and logical inference. Herbrand model, construction and usability. SLD-resolution and query, SLD trees. Logic and databases, relational databases, deductive databases. Logic and expert systems. Basic notions of Lattice Theory and Formal Concept Analysis (FCA). Basic notions of Fuzzy logic and Fuzzy extension of FCA. Optimal table decomposition, factorisation. Intercontextual structures, bonds.					
<b>Recommended literature:</b> Shawn Hedman. A first course in logic: An introduction to model theory, proof theory, computability and complexity. Oxford university press, ISBN 0–19–852980–5, 2006. Shan-Hwei Nienhuys-Cheng, Ronald de Wolf. Foundations of Inductive Logic Programming. Springer-Verlag, ISBN 3-540-62927-0, 1997. Kristian Kersting. An Inductive Logic Programming Approach to Statistical Relational Learning, IOS Press, ISBN 1-58603-674-2, 2006. Nilsson U., Maluszynski J.: Logic, Programming and Prolog, John Wiley & Sons Ltd. 1995. Bělohlávek R.: Fuzzy Relational Systems: Foundations and Principles. Kluwer, Academic/Plenum Publishers, New York, 2002. Ganter B., Wille R.: Formal Concept Analysis: Mathematical Foundations, Springer Berlin, 1999.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 60					
A	B	C	D	E	FX
46.67	5.0	21.67	10.0	10.0	6.67

<b>Provides:</b> doc. RNDr. Stanislav Krajčí, PhD., RNDr. Ondrej Krídlo, PhD.
<b>Date of last modification:</b> 03.05.2015
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ FML/15		<b>Course name:</b> Fuzzy sets and fuzzy logic			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 2., 4.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> To understand basic notions of fuzzified approach to the mathematical logic and the set theory.					
<b>Brief outline of the course:</b> Motivation. Definitions of basic notions. Fuzzy logic as an extension of classical one. Different types of fuzzy logics. Fuzzy connections (t-norms, t-conorms). Fuzzy relations, Chu spaces.					
<b>Recommended literature:</b> 1. H. T. Nguyen, E. A. Walker: A First Course in Fuzzy Logic, Chapman & Hall/CRC, 2006 2. V. Novák: Fuzzy množiny a ich aplikace, SNTL Praha 1986, in Czech, 1986					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 6					
A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Stanislav Krajčí, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ THR/10		<b>Course name:</b> Game theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 / 1 <b>Per study period:</b> 42 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Two written exams during the semester. The final assessment is based on the written tests and oral examination.					
<b>Learning outcomes:</b> To learn the basic methods of game theory. We also require that students will be able to model situations from everyday life as simple games.					
<b>Brief outline of the course:</b> Examples of games. Extensive form of a game, value of the game. Von Neumann Morgenstern theory of utility. Matrix games and their solution. Bimatrix games. Theory of negotiations. n-person games: core, Shapley value. Economic applications of game theory. The students should have basic knowledge in probability theory and linear programming (including duality theory and simplex method).					
<b>Recommended literature:</b> 1. K. Binmore, Fun and games, D.C. Heath, 1992 2. G. Owen, Game Theory, Academic Press (existuje ruský preklad). 3. A.R. Karlin, Y. Peres, Game theory alive, American Mathematical Society, 2017 4. L.C. Thomas, Games, Theory and Applications, Wiley, New York. 5. H.S. Bierman, L. Fernandez, Game Theory with Economic Applications, Addison-Wesley, 1998.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 135					
A	B	C	D	E	FX
17.78	24.44	20.74	20.74	15.56	0.74
<b>Provides:</b> prof. RNDr. Katarína Cechlárová, DrSc.					

<b>Date of last modification:</b> 07.04.2020
<b>Approved:</b> prof. RNDr. Mirko Hornák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ GZB/10		<b>Course name:</b> Geometric transformations			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Exam realized by a test.					
<b>Learning outcomes:</b> To obtain a deeper knowledge on projective spaces and transformation groups.					
<b>Brief outline of the course:</b> Projective spaces, Projective transformations, collineations. Fixed elements of a collineation. A clasification of collineations.					
<b>Recommended literature:</b> S. V. Duzhin, B. D. Chebotarevsky: Transformation Groups for Beginners, AMS 2004					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 27					
A	B	C	D	E	FX
37.04	29.63	22.22	7.41	3.7	0.0
<b>Provides:</b> doc. RNDr. Jaroslav Ivančo, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ TGF/10	<b>Course name:</b> Graph theory
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Oral exam.	
<b>Learning outcomes:</b> Basic knowledge concerning methods how new discoveries in mathematics. Deeper knowledge on selected topics in graph theory.	
<b>Brief outline of the course:</b> Embeddings graphs into surfaces. Global properties of embedded graphs: Oblique graphs (Voigt and Walther's theorem), Platonic and Archimedean solids. Introduction into the theory of light graphs: Kotzig's theorem, Borodin's theorem, Fabrici and Jendrol's theorem, light paths. Introduction into colourings of embedded graphs: The four colour theorem, rainbow colourings, parity colourings, and non-repetitive colourings. Words and colourings.	
<b>Recommended literature:</b> <ol style="list-style-type: none"> <li>1. J. Barat, J. Czap: Facial nonrepetitive vertex coloring of plane graphs, J. Graph Theory, DOI:10.1002/jgt21695.</li> <li>2. J. A. Bondy, U.S R. Murty: Graph Theory, Springer 2008.</li> <li>3. J. Czap, S. Jendrol', F. Kardoš, R. Soták: Facial parity edge colouring of plane pseudographs, Discrete Math. 312(2012), 2735-2740.</li> <li>4. J. Czap, S. Jendrol', M. Voigt: Parity vertex colouring of plane graphs, Discrete Math. 311(2011), 512-520.</li> <li>5. G. Chartrand, L. Lesniak, P. Zhang: Graphs and digraphs, CRC Press, Boca Raton 2011.</li> <li>6. F. Havet, S. Jendrol', R. Soták, E. Škrabuľáková, Facial non-repetitive edge-coloring of plane graphs, J. Graph Theory 66(2011), 38-48.</li> <li>7. S. Jendrol', H.-J. Voss: Light subgraphs of graphs embedded in the plane - A Survey, Discrete Math. 313(2013), 406-421.</li> </ol>	
<b>Course language:</b> Slovak	

<b>Notes:</b>					
<b>Course assessment</b>					
Total number of assessed students: 61					
A	B	C	D	E	FX
55.74	13.11	14.75	9.84	6.56	0.0
<b>Provides:</b> Dr.h.c. prof. RNDr. Stanislav Jendroľ, DrSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ TGP/10		<b>Course name:</b> Group theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 2., 4.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Awarded according to written and oral examination.					
<b>Learning outcomes:</b> The students learn basic concepts and methods of group theory and their applications in various parts of mathematics.					
<b>Brief outline of the course:</b> Groups of symmetries, abstract groups. Subgroups, orders of elements, cyclic groups. Normal subgroups, factorization. Classification of finitely generated abelian groups. Sylow subgroups, p-groups. Groups in linear algebra.					
<b>Recommended literature:</b> S. MacLane, G. Birkhoff: Algebra, Alfa Bratislava, 1973 L. Beran: Grupy a svazy, SNTL Praha, 1974 D.A.R. Wallace: Groups, Rings and Fields, Springer 1998 J. J. Rotman: Advanced Modern Algebra, Amer. Math. Soc., Providence 2010					
<b>Course language:</b> Slovak or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 45					
A	B	C	D	E	FX
40.0	22.22	20.0	11.11	6.67	0.0
<b>Provides:</b> doc. RNDr. Miroslav Ploščica, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KFaDF/DF2p/03		<b>Course name:</b> History of Philosophy 2 (General Introduction)			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 739					
A	B	C	D	E	FX
60.89	13.8	12.58	8.66	3.38	0.68
<b>Provides:</b> doc. PhDr. Pavol Tholt, PhD., mim. prof., Doc. PhDr. Peter Nezník, CSc., PhDr. Katarína Mayerová, PhD., doc. Mgr. Róbert Stojka, PhD.					
<b>Date of last modification:</b> 25.03.2020					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KFaDF/IH2/03		<b>Course name:</b> Idea Humanitas 2 (General Introduction)			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 8					
A	B	C	D	E	FX
87.5	12.5	0.0	0.0	0.0	0.0
<b>Provides:</b> Doc. PhDr. Peter Nezník, CSc.					
<b>Date of last modification:</b> 12.02.2020					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/MSI/14		<b>Course name:</b> Informatical Mathematics			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Acquiring the required number of credits in the structure defined by the study plan.					
<b>Learning outcomes:</b> Evaluation of student's competences with respect to the profile of the graduate.					
<b>Brief outline of the course:</b> The state exam is organised as a discourse focusing on one subject from the courses ÚINF/KMU1 (equivalently ÚINF/KPI), ÚMV/TKO, ÚINF/VYZ1 and ÚMV/KOA. 1. Arithmetical coding. 2. The use of discrete Fourier transform in coding. 3. Test for identifying codes. 4. Using Bernoulli distribution to classify codes. 5. The notion of a nondeterministic algorithm working in polynomial time, NP-completeness. 6. Important NP-complete problems. 7. Eulerian graphs, Chinese Postman Problem. 8. Travelling Salesman Problem – results on complexity, approximation algorithms.					
<b>Recommended literature:</b>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 13					
A	B	C	D	E	FX
46.15	7.69	23.08	15.38	7.69	0.0
<b>Provides:</b>					
<b>Date of last modification:</b> 26.04.2016					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ AIS1/15		<b>Course name:</b> Information systems architecture			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Work on project. Written and oral examination					
<b>Learning outcomes:</b> To provide an overview of the modern methodologies of information system development. To introduce the fundamental principles of conceptual modelling of information systems.					
<b>Brief outline of the course:</b> System, information system, information pyramid. Conceptualisation of information systems. ISO model of the architecture of an information system. Introduction to MDA, software development life cycle based on MDA. Model, metamodel, modelling language. Model transformation and marking models. Entity types. Relationship types. Cardinality constraints. Integrity constraints. Taxonomies. Domain events. Use cases. State transition diagrams.					
<b>Recommended literature:</b> 1. <a href="http://www.omg.org">http://www.omg.org</a> 2. Ian Sommerville, Software Engineering, Addison-Wesley 2005 3. Anneke Kleppe, Wim Bast, Jos B Warmer, MDA Explained, the Model Driven Architecture, Addison-Wesley 2003 4. Scott Berkun, The Art Of Project Management, O Reilly 2005					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 179					
A	B	C	D	E	FX
19.55	30.17	26.26	8.94	11.17	3.91
<b>Provides:</b> prof. RNDr. Gabriel Semanišin, PhD.					
<b>Date of last modification:</b> 01.06.2015					

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ TIN/10		<b>Course name:</b> Information theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A and one from the group B (both for 50 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.					
<b>Learning outcomes:</b> A student gets acquainted with a mathematical attempt to solve some problems of computer science.					
<b>Brief outline of the course:</b> A quantitative characteristic of an information. Entropy of a random variable. Mutual information. Inequalities involving mutual information and entropy, respectively. Typical sequence, typical set. Data compression.					
<b>Recommended literature:</b> T. M. Cover, J. A. Thomas, Elements of Information Theory, Wiley, 1991 (2nd ed. 2006) T. K. Moon, Information Theory (free online course materials), available at the address <a href="http://digitalcommons.usu.edu/ocw_ece/3/">http://digitalcommons.usu.edu/ocw_ece/3/</a>					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 96					
A	B	C	D	E	FX
40.63	17.71	17.71	11.46	8.33	4.17
<b>Provides:</b> prof. RNDr. Mirko Horňák, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ TZV/10		<b>Course name:</b> Lattice theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 2., 4.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Awarded according to written and oral examination.					
<b>Learning outcomes:</b> The students learn basic concepts and methods of lattice theory and gain the ability to apply them in various parts of mathematics.					
<b>Brief outline of the course:</b> Ordered sets and lattices. Distributivity and modularity. Ideals and set-theoretical representation. Completeness and completions. Formal concept analysis.					
<b>Recommended literature:</b> G. Grätzer: General Lattice Theory (2nd edition), Birkhäuser, 1998 B. A. Davey, H. A. Priestley: Introduction to lattices and order, Cambridge University Press 1990 M. Kolibiar: Algebra a príbuzné disciplíny, Alfa Bratislava, 1991					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 29					
A	B	C	D	E	FX
34.48	13.79	31.03	17.24	3.45	0.0
<b>Provides:</b> doc. RNDr. Miroslav Ploščica, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ LAD1/15		<b>Course name:</b> Logical aspects of databases			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> To understand and to be able to formalize relationships between databases, first order logic and logic programming.					
<b>Brief outline of the course:</b> Relationships between databases, logic and logic programming.					
<b>Recommended literature:</b> Serge Abiteboul, Richard Hull, Victor Vianu: Foundations of Databases. Addison-Wesley 1995, ISBN 0-201-53771-0					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 88					
A	B	C	D	E	FX
42.05	19.32	17.05	11.36	7.95	2.27
<b>Provides:</b> doc. RNDr. Stanislav Krajčí, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ MLG/15		<b>Course name:</b> Mathematical logic			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 / 1 <b>Per study period:</b> 28 / 14 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> To understand basic notions of predicate logic (logic language, term, formula, axioms, proof, provability, truth, model, syntax and semantics, soundness, completeness), its axiomatic construction, and its influence to the set theory and the database theory.					
<b>Brief outline of the course:</b> Predicate logic – logic language, syntax and semantics, term, formula. Axioms, proof, provability. Interpretation, truth, model. Soundness of the predicate logic. Boolean algebras. Syntactic model, completeness of predicate logic. Inductive structures in general. Applications of logic in set theory. Applications of logic in database systems.					
<b>Recommended literature:</b> 1. M. Goldstern, H. Judah: The Incompleteness Phenomenon, A New Course in Mathematical Logic, A K Peters, Wellesley, Massachusetts, 1995 2. S. Abiteboul, R. Hull, V. Vianu: Foundations of databases, Addison-Wesley Publishing Co, 1995 3. <a href="http://cs.ics.upjs.sk/~krajci/skola/vyucba/ucebneTexty/logika/logika.pdf">http://cs.ics.upjs.sk/~krajci/skola/vyucba/ucebneTexty/logika/logika.pdf</a> (2008, in Slovak)					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 5					
A	B	C	D	E	FX
40.0	20.0	0.0	0.0	20.0	20.0

<b>Provides:</b> doc. RNDr. Stanislav Krajčí, PhD., RNDr. Ondrej Krídlo, PhD.
<b>Date of last modification:</b> 03.05.2015
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/TMT/10		<b>Course name:</b> Matroid theory			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A (65 points at maximum) and one from the group B (35 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.					
<b>Learning outcomes:</b> A student gets acquainted with basic notions of matroid theory and possibilities of using matroids in various disciplines of discrete mathematics.					
<b>Brief outline of the course:</b> Independent sets and bases. Properties of rank function. Closure operator. Circuits. Duality in matroids. Hyperplanes.					
<b>Recommended literature:</b> D. J. A. Welsh: Matroid Theory, Academic Press, 1976 J. Oxley, Matroid Theory, Oxford University Press, 2010					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 35					
A	B	C	D	E	FX
22.86	14.29	25.71	8.57	17.14	11.43
<b>Provides:</b> prof. RNDr. Mirko Horňák, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚBEV/ MOB2/10		<b>Course name:</b> Molecular Biology			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> Familiarize students with the structure, properties and functions of information macromolecules and their work, focusing primarily on the molecular mechanisms of regulation of DNA replication, gene expression and cell cycle.					
<b>Brief outline of the course:</b> Structure and properties of information macromolecules. Molecular structure of chromatin and mitotic and meiotic chromosomes. Dynamics of chromosomes. Replication of chromosomal and extrachromosomal DNA. Repair of DNA damage. Genome of prokaryotic and eukaryotic cells. The human genome. Mobile genetic elements. Transcription and posttranscriptional modifications and editing. Translation and posttranslational modifications. Specific protein degradation. DNA-protein interactions. Regulation of the expression of prokaryotic and eukaryotic genes. Control of the cell cycle.					
<b>Recommended literature:</b> E. Mišúrová: Molekulárna biológia. Učebné texty, PF UPJŠ Košice, 1999 E. Mišúrová, P. Solár: Molekulová biológia. Učebné texty, PF UPJŠ, 2007 S. Rosypal: Úvod do molekulární biologie. Grafex Blansko, Brno, 1999 Alberts, D. Bray, J. Lewis a kol.: Molecular Biology of the Cell, Academic Press, London, 1994 D.P. Clark: Molecular Biology, Elsevier Academic Press, London, 2005					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 1					
A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> doc. RNDr. Peter Solár, PhD.					
<b>Date of last modification:</b> 03.05.2015					

**Approved:** prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> Dek. PF UPJŠ/PPZ/13		<b>Course name:</b> Personality Development and Key Competences for Success on a Labour Market			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 14s <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 39					
A	B	C	D	E	FX
100.0	0.0	0.0	0.0	0.0	0.0
<b>Provides:</b> RNDr. Peter Stefányi, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ POT/10	<b>Course name:</b> Polyhedral theory
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 4	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Oral exam.	
<b>Learning outcomes:</b> Mastered basic knowledge from theory of convex polyhedra and polyhedral maps.	
<b>Brief outline of the course:</b> Classification of surfaces. Combinatorial and geometric properties of three-dimensional convex polyhedra. Graphs of polyhedra. Polyhedral maps. Euler's theorem, Steinitz' theorem. Light subgraphs. Face- and vertex- vectors. Eberhard's theorem. Groups of symmetries of polyhedra. Applications in optimization and chemistry.	
<b>Recommended literature:</b> 1. B. Grünbaum: Convex polytopes (2nd edition), Springer New York, 2003. 2. S. Jendrol': Light subgraphs of graphs embedded in the plane - a survey, Discrete Math. 313(2013), 406-421. 3. E. Jucovič: Konvexné mnohosteny, Veda Bratislava 1981. 4. G. Ringel, Map color theorem, Springer-Verlag 1974. 2. G.M. Ziegler: Lectures on Polytopes, Springer-Verlag, New York, 1996	
<b>Course language:</b> Slovak	
<b>Notes:</b>	



<b>Course assessment</b>					
Total number of assessed students: 15					
A	B	C	D	E	FX
86.67	0.0	0.0	13.33	0.0	0.0
<b>Provides:</b> Dr.h.c. prof. RNDr. Stanislav Jendroľ, DrSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPPaPZ/PPZMg/12		<b>Course name:</b> Psychology and Health Psychology (Master's Study)			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture / Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 1 / 2 <b>Per study period:</b> 14 / 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 226					
A	B	C	D	E	FX
19.47	25.22	25.66	13.27	15.93	0.44
<b>Provides:</b> PhDr. Anna Janovská, PhD., Mgr. Lucia Hricová, PhD.					
<b>Date of last modification:</b> 07.03.2018					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ ÚTVŠ/CM/13	<b>Course name:</b> Seaside Aerobic Exercise
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 36s <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for course completion: Attendance	
<b>Learning outcomes:</b> Learning outcomes: Students will be provided an overview of possibilities how to spend leisure time in seaside conditions actively and their skills in work and communication with clients will be improved. Students will acquire practical experience in organising the cultural and art-oriented events, with the aim to improve the stay and to create positive experiences for visitors.	
<b>Brief outline of the course:</b> Brief outline of the course: 1. Basics of seaside aerobics 2. Morning exercises 3. Pilates and its application in seaside conditions 4. Exercises for the spine 5. Yoga basics 6. Sport as a part of leisure time 7. Application of projects of productive spending of leisure time for different age and social groups (children, young people, elderly) 8. Application of seaside cultural and art-oriented activities in leisure time	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 42	
abs	n
11.9	88.1

<b>Provides:</b> Mgr. Alena Buková, PhD., Mgr. Agata Horbacz, PhD.
<b>Date of last modification:</b> 15.03.2019
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚMV/ SHM/10	<b>Course name:</b> Seminar on history of mathematics
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1., 3.	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Homework, presentation on the chosen topic during the seminar. More than 91 points - evaluation of A. 81-90 points - evaluation of B. 71-80 points - rating C. 61-70 points - evaluation of D. 51-60 points - evaluation of E. Less than 50 points - FX evaluation.	
<b>Learning outcomes:</b> Students get an overview of the history of the development of certain mathematical disciplines and selected terms and about parallel between phylogenesis and ontogenesis of mathematical thinking.	
<b>Brief outline of the course:</b> Mathematics in Early Civilizations. Greek Mathematics. Mathematics in the Near and Far East (Arabia, China, India). Medieval European Mathematics. The Renaissance of Mathematics. The Beginning of Modern Mathematics.	
<b>Recommended literature:</b> Burton, D. M.: The History of Mathematics: An Introduction. McGraw–Hill, 2007. Devlin, K.: Jazyk matematiky. Dokořán, 2002 (in czech) Kolman, A.: Dejiny matematiky ve starověku. Academia, Praha, 1968 (in slovak) Juškevič, A. P.: Dejiny matematiky ve středověku. Academia, Praha 1977 (in slovak) Znáň, Š. a kol.: Pohľad do dejín matematiky. Alfa, Bratislava, 1986 (in slovak) Konforovič, A.G.: Významné matematické úlohy, SPN Praha, 1989 (in slovak)	
<b>Course language:</b> Slovak	
<b>Notes:</b>	

<b>Course assessment</b>					
Total number of assessed students: 145					
A	B	C	D	E	FX
80.0	7.59	6.9	2.76	2.76	0.0
<b>Provides:</b> RNDr. Ingrid Semanišínová, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚINF/DSN1a/15	<b>Course name:</b> Seminar on neural networks and stringology
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b> To study new knowledges in the area of neural networks and stringology in the seminar form. To follow current state in the area using conference proceedings and special journals.	
<b>Brief outline of the course:</b> Seminar is oriented to an individual work with students which have the diploma theses in the area: neural networks and stringology.	
<b>Recommended literature:</b> Special and research literature connected to Diploma theses according to recommendations of supervisor. Katuščák, D.: Ako písať vysokoškolské a kvalifikačné práce, 2. vydanie Bratislava, 1998 ISO 690: 1987 Documentation - Bibliographic references. Content, form and structure. ISO 2145: 1978 Documentation - Numbering of divisions and subdivisions in written documents.	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 14	
abs	n
92.86	7.14
<b>Provides:</b> doc. RNDr. Gabriela Andrejková, CSc.	
<b>Date of last modification:</b> 03.05.2015	
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚINF/ SDM1a/15		<b>Course name:</b> Seminár on data mining			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> Deepened knowledge and gained overview of the state-of-the-art in the area of data mining.					
<b>Brief outline of the course:</b> The seminar is devoted to study and discussion about recent advances in the field of data mining.					
<b>Recommended literature:</b> Jiawei Han, Micheline Kamber, Jian Pei. Data Mining: Concepts and Techniques. Morgan Kaufmann, ISBN 978-0123814791, 2011. Pang-Ning Tan, Michael Steinbach, Vipin Kumar. Introduction to Data Mining. Addison-Wesley, ISBN 978-0321321367, 2005. Ethem Alpaydın. Introduction to Machine Learning, The MIT Press, ISBN 978-0-262-01211-9, 2004.					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 23					
A	B	C	D	E	FX
47.83	8.7	21.74	13.04	8.7	0.0
<b>Provides:</b> RNDr. Tomáš Horváth, PhD.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice		
<b>Faculty:</b> Faculty of Science		
<b>Course ID:</b> KPPaPZ/SPVKE/07	<b>Course name:</b> Social-Psychological Training of Coping with Critical Life Situations	
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present		
<b>Number of ECTS credits:</b> 2		
<b>Recommended semester/trimester of the course:</b> 2.		
<b>Course level:</b> II.		
<b>Prerequisites:</b>		
<b>Conditions for course completion:</b>		
<b>Learning outcomes:</b>		
<b>Brief outline of the course:</b>		
<b>Recommended literature:</b>		
<b>Course language:</b>		
<b>Notes:</b>		
<b>Course assessment</b> Total number of assessed students: 126		
abs	n	z
97.62	2.38	0.0
<b>Provides:</b> Mgr. Ondrej Kalina, PhD.		
<b>Date of last modification:</b> 18.03.2019		
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.		

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ TVa/11	<b>Course name:</b> Sports Activities I.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 1.	
<b>Course level:</b> I., I.II., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for course completion: Min. 80% of active participation in classes.	
<b>Learning outcomes:</b> Learning outcomes: Increasing physical condition and performance within individual sports. Strengthening the relationship of students to the selected sports activity and its continual improvement.	
<b>Brief outline of the course:</b> Brief outline of the course: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, basketball, badminton, floorball, yoga, pilates, swimming, body-building, indoor football, self-defence and karate, table tennis, sports for unfit persons, streetball, tennis, and volleyball. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or international participation.	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>							
Total number of assessed students: 12947							
abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
88.64	0.06	0.0	0.0	0.0	0.03	7.22	4.05
<b>Provides:</b> doc. PhDr. Ivan Šulc, CSc., Mgr. Zuzana Küchelová, PhD., Mgr. Peter Bakalár, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Dávid Kaško, Mgr. Aurel Zelko, PhD., Mgr. Dana Dračková, PhD., Mgr. Marcel Čurgali, PaedDr. Jana Potočnicková, PhD.							
<b>Date of last modification:</b> 18.03.2019							
<b>Approved:</b> prof. RNDr. Mirko Hornák, CSc.							

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ TVb/11	<b>Course name:</b> Sports Activities II.
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b> 2.	
<b>Course level:</b> I., I.II., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for course completion: Final assessment and active participation in classes - min. 75%.	
<b>Learning outcomes:</b> Learning outcomes: Increasing physical condition and performance within individual sports. Strengthening the relationship of students to the selected sports activity and its continual improvement.	
<b>Brief outline of the course:</b> Brief outline of the course: Within the optional subject, the Institute of Physical Education and Sports of Pavol Jozef Šafárik University provides for students the following sports activities: aerobics, basketball, badminton, floorball, yoga, pilates, swimming, body-building, indoor football, self-defence and karate, table tennis, sports for unfit persons, streetball, tennis, and volleyball. In the first two semesters of the first level of education students will master basic characteristics and particularities of individual sports, motor skills, game activities, they will improve level of their physical condition, coordination abilities, physical performance, and motor performance fitness. Last but not least, the important role of sports activities is to eliminate swimming illiteracy and by means of a special program of medical physical education to influence and mitigate unfitness. In addition to these sports, the Institute offers for those who are interested winter and summer physical education trainings with an attractive program and organises various competitions, either at the premises of the faculty or University or competitions with national or international participation.	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>							
Total number of assessed students: 11186							
abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.58	0.55	0.02	0.0	0.0	0.05	9.99	3.8
<b>Provides:</b> doc. PhDr. Ivan Šulc, CSc., Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Peter Bakalár, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Dávid Kaško, Mgr. Aurel Zelko, PhD., Mgr. Dana Dračková, PhD., Mgr. Marcel Čurgali, PaedDr. Jana Potočnicková, PhD.							
<b>Date of last modification:</b> 18.03.2019							
<b>Approved:</b> prof. RNDr. Mirko Hornák, CSc.							

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice							
<b>Faculty:</b> Faculty of Science							
<b>Course ID:</b> ÚTVŠ/ TVc/11		<b>Course name:</b> Sports Activities III.					
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present							
<b>Number of ECTS credits:</b> 2							
<b>Recommended semester/trimester of the course:</b> 3.							
<b>Course level:</b> I., I.II., II.							
<b>Prerequisites:</b>							
<b>Conditions for course completion:</b>							
<b>Learning outcomes:</b>							
<b>Brief outline of the course:</b>							
<b>Recommended literature:</b>							
<b>Course language:</b>							
<b>Notes:</b>							
<b>Course assessment</b> Total number of assessed students: 7741							
abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
90.03	0.04	0.01	0.0	0.0	0.03	4.04	5.85
<b>Provides:</b> doc. PhDr. Ivan Šulc, CSc., Mgr. Zuzana Küchelová, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Peter Bakalár, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Dávid Kaško, Mgr. Aurel Zelko, PhD., Mgr. Dana Dračková, PhD., Mgr. Marcel Čurgali, PaedDr. Jana Potočnicková, PhD.							
<b>Date of last modification:</b> 03.05.2015							
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.							

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice							
<b>Faculty:</b> Faculty of Science							
<b>Course ID:</b> ÚTVŠ/ TVd/11		<b>Course name:</b> Sports Activities IV.					
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present							
<b>Number of ECTS credits:</b> 2							
<b>Recommended semester/trimester of the course:</b> 4.							
<b>Course level:</b> I., I.II., II.							
<b>Prerequisites:</b>							
<b>Conditions for course completion:</b>							
<b>Learning outcomes:</b>							
<b>Brief outline of the course:</b>							
<b>Recommended literature:</b>							
<b>Course language:</b>							
<b>Notes:</b>							
<b>Course assessment</b> Total number of assessed students: 5086							
abs	abs-A	abs-B	abs-C	abs-D	abs-E	n	neabs
85.19	0.29	0.04	0.0	0.0	0.0	6.78	7.69
<b>Provides:</b> doc. PhDr. Ivan Šulc, CSc., Mgr. Zuzana Küchelová, PhD., Mgr. Peter Bakalár, PhD., doc. PaedDr. Ivan Uher, PhD., Mgr. Agata Horbacz, PhD., Mgr. Marek Valanský, prof. RNDr. Stanislav Vokál, DrSc., Mgr. Lucia Kršňáková, PhD., Mgr. Dávid Kaško, Mgr. Aurel Zelko, PhD., Mgr. Dana Dračková, PhD., Mgr. Marcel Čurgali, PaedDr. Jana Potočnicková, PhD.							
<b>Date of last modification:</b> 03.05.2015							
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.							

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚFV/SEV/10		<b>Course name:</b> Structure and Evolution of the Universe			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week: 2 Per study period: 28</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 3					
<b>Recommended semester/trimester of the course:</b> 2.					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> Due to Covid-19 adapted to carry out distance learning: 1. Preparation of own notes on the topics covered on the basis of provided study materials. 2. Seminar essay. Send the title of the selected topic to the lecturer no later than the end of the semester (May 15, 2020). 3. Oral exam within the curriculum of the course using electronic facilities (Skype/Hangouts)					
<b>Learning outcomes:</b> Become acquainted with basic knowledge about the structure and evolution of the universe.					
<b>Brief outline of the course:</b> The stars, their basic properties, structure and evolution. Structure and distribution of matter in the universe. Cosmological theories, formation, evolution and future of the universe.					
<b>Recommended literature:</b> 1. Carroll, B. W., Ostlie, D. A., An Introduction to Modern Astrophysics, Addison-Wesley Publishing Company, Reading, Massachusetts, 1996; 2. Contopoulos, D. Kotsakis, Cosmology, the structure and evolution of the Universe, Springer, 1984; 3. Narlikar, J.V., An Introduction to Cosmology, Cambridge University Press, Cambridge, 2002; 4. Pasachoff, J.M., Filippenko, A., The Cosmos: Astronomy in the New Millennium, Cambridge University Press, 2013;					
<b>Course language:</b> Slovak, English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 120					
A	B	C	D	E	FX
31.67	30.0	14.17	13.33	10.83	0.0
<b>Provides:</b> doc. RNDr. Rudolf Gális, PhD.					



<b>Date of last modification:</b> 28.03.2020
<b>Approved:</b> prof. RNDr. Mirko Hornák, CSc.

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ SVK/10		<b>Course name:</b> Students scientific conference			
<b>Course type, scope and the method:</b> <b>Course type:</b> <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 4					
<b>Recommended semester/trimester of the course:</b>					
<b>Course level:</b> I., II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b> Individual scientific work of students. Publishing of obtained results in a written form and as a public presentation.					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b> With respect to the research problematics (article in journals, books).					
<b>Course language:</b> Slovak or English					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 94					
A	B	C	D	E	FX
98.94	1.06	0.0	0.0	0.0	0.0
<b>Provides:</b> prof. RNDr. Mirko Horňák, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ LKSp/13	<b>Course name:</b> Summer Course-Rafting of TISA River
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 36s <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for course completion: Attendance Final assessment: Raft control on the waterway (attended/not attended)	
<b>Learning outcomes:</b> Learning outcomes: Students have knowledge of rafts (canoe) and their control on waterway.	
<b>Brief outline of the course:</b> Brief outline of the course: 1. Assessment of difficulty of waterways 2. Safety rules for rafting 3. Setting up a crew 4. Practical skills training using an empty canoe 5. Canoe lifting and carrying 6. Putting the canoe in the water without a shore contact 7. Getting in the canoe 8. Exiting the canoe 9. Taking the canoe out of the water 10. Steering a) The pry stroke (on fast waterways) b) The draw stroke 11. Capsizing 12. Commands	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>	
Total number of assessed students: 151	
abs	n
45.03	54.97
<b>Provides:</b> Mgr. Peter Bakalár, PhD.	
<b>Date of last modification:</b> 18.03.2019	
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ KP/12	<b>Course name:</b> Survival Course
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week: Per study period:</b> 36s <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b> Conditions for course completion: Attendance Final assessment: continuous fulfilment of all tasks within the course	
<b>Learning outcomes:</b> Learning outcomes: Students will be familiarized with principles of safe stay and movement in extreme natural conditions as they will obtain theoretical knowledge and practical skills to solve the extraordinary and demanding situations connected with survival and minimization of damage to health. The course develops team work and students will learn how to manage and face the situations that require overcoming of obstacles.	
<b>Brief outline of the course:</b> Brief outline of the course: Lectures: 1. Principles of behaviour and safety for movement and stay in unknown mountains 2. Preparation and leadership of tour 3. Objective and subjective danger in mountains 4. Principles of hygiene and prevention of damage to health in extreme conditions Exercises: 1. Movement in terrain, orientation and navigation in terrain (compasses, GPS) 2. Preparation of improvised overnight stay 3. Water treatment and food preparation.	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	

<b>Course assessment</b>	
Total number of assessed students: 392	
abs	n
44.39	55.61
<b>Provides:</b> Mgr. Marek Valanský, MUDr. Peter Dombrovský	
<b>Date of last modification:</b> 15.03.2019	
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.	

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> KPPaPZ/UPR/03		<b>Course name:</b> The Art of Aiding by Verbal Exchange			
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 2 <b>Per study period:</b> 28 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 2					
<b>Recommended semester/trimester of the course:</b> 4.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b>					
<b>Learning outcomes:</b>					
<b>Brief outline of the course:</b>					
<b>Recommended literature:</b>					
<b>Course language:</b>					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 49					
A	B	C	D	E	FX
85.71	4.08	2.04	2.04	2.04	4.08
<b>Provides:</b> Mgr. Ondrej Kalina, PhD.					
<b>Date of last modification:</b> 18.03.2019					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ TKO/10		<b>Course name:</b> Theory of codes			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 4 <b>Per study period:</b> 56 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 6					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> A student is evaluated according to an oral examination during which he/she answers two questions chosen by him/her at random, one from the group A and one from the group B (both for 50 points at maximum). Evaluation scale: A ... 90-100 p., B ... 80-89 p., C ... 70-79 p., D ... 60-69 p., E ... 50-59 p., FX ... 0-49 p.					
<b>Learning outcomes:</b> A student gets acquainted with basic principles and theoretical bases of text coding and possibilities of their application.					
<b>Brief outline of the course:</b> Monoids. Basic notions of theory of codes. Examples of codes. Important classes of codes. Maximal codes. Submonoids generated by codes. Stable submonoids. Group codes. Free hull of a set of words. Test for recognising codes. Measure of a code. Bernoulli distribution. Dyck code. Complete sets in monoids. Thin codes. Composition of codes. Indecomposable codes.					
<b>Recommended literature:</b> J. Berstel and D. Perrin, Theory of Codes, Academic Press, 1985					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 50					
A	B	C	D	E	FX
26.0	14.0	10.0	16.0	22.0	12.0
<b>Provides:</b> prof. RNDr. Mirko Horňák, CSc.					
<b>Date of last modification:</b> 03.05.2015					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					



## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice					
<b>Faculty:</b> Faculty of Science					
<b>Course ID:</b> ÚMV/ UAL/10		<b>Course name:</b> Universal algebra			
<b>Course type, scope and the method:</b> <b>Course type:</b> Lecture <b>Recommended course-load (hours):</b> <b>Per week:</b> 3 <b>Per study period:</b> 42 <b>Course method:</b> present					
<b>Number of ECTS credits:</b> 5					
<b>Recommended semester/trimester of the course:</b> 1., 3.					
<b>Course level:</b> II.					
<b>Prerequisites:</b>					
<b>Conditions for course completion:</b> According to results of the exam (written+oral).					
<b>Learning outcomes:</b> To obtain basic knowledge from universal algebra and to be able to apply it in concrete situations.					
<b>Brief outline of the course:</b> Algebraic structures. Homomorphisms and congruences. Direct and subdirect products. Terms. Free algebras. Birkhoff theorems about varieties.					
<b>Recommended literature:</b> S.Burris, H.P.Sankappanavar: A Course in Universal Algebra. Springer-Verlag, 1981. B. Jónsson: Topics in universal algebra, Springer-Verlag 1972. G. Grätzer: Universal Algebra, 2nd edition, Springer Verlag, 1979.					
<b>Course language:</b> Slovak					
<b>Notes:</b>					
<b>Course assessment</b> Total number of assessed students: 36					
A	B	C	D	E	FX
30.56	30.56	22.22	5.56	5.56	5.56
<b>Provides:</b> prof. RNDr. Danica Studenovská, CSc.					
<b>Date of last modification:</b> 31.01.2019					
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.					

## COURSE INFORMATION LETTER

<b>University:</b> P. J. Šafárik University in Košice	
<b>Faculty:</b> Faculty of Science	
<b>Course ID:</b> ÚTVŠ/ ZKLS//13	<b>Course name:</b> Winter Ski Training Course
<b>Course type, scope and the method:</b> <b>Course type:</b> Practice <b>Recommended course-load (hours):</b> <b>Per week:</b> 36 <b>Per study period:</b> 504 <b>Course method:</b> present	
<b>Number of ECTS credits:</b> 2	
<b>Recommended semester/trimester of the course:</b>	
<b>Course level:</b> I., II.	
<b>Prerequisites:</b>	
<b>Conditions for course completion:</b>	
<b>Learning outcomes:</b>	
<b>Brief outline of the course:</b>	
<b>Recommended literature:</b>	
<b>Course language:</b>	
<b>Notes:</b>	
<b>Course assessment</b> Total number of assessed students: 97	
abs	n
32.99	67.01
<b>Provides:</b> doc. PhDr. Ivan Šulc, CSc., Mgr. Marek Valanský	
<b>Date of last modification:</b> 03.05.2015	
<b>Approved:</b> prof. RNDr. Mirko Horňák, CSc.	